REMARKS

Favorable reconsideration and allowance of the present application are respectfully requested.

Claims 1-2 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Pat. No. 6,006,163 to Lichtenwalner. By the above amendment, claims 1-2 have been cancelled without prejudice. As such, the rejection of these claims is believed to be moot.

While claims 1-2 have been cancelled, some comments about differences between Lichtenwalner and the subject matter described in the present application are in order. In this regard, Lichtenwalner discloses a system utilizing piezoelectric transducers operating at frequencies up to 100 KHz. Col. 6, line 23 and claim 4. The patent states that transducer signals are digitized and the transfer function (TF) amplitude and phase of each actuator/sensor pair is computed. Col. 4, lines 30-33. The calculated transfer function is then compared against a baseline transfer function for that actuator/sensor pair previously obtained with the structure in an undamaged state. Col. 4, lines 33-37.

After the transfer function comparison, a damage index (DI) for each actuator can be determined. Col. 6, lines 51-54. The actuator with the highest DI is used to identify the damage zone. Col. 6, lines 64-65. Center of mass equations, with appropriate

substitution of the DI values for the point-mass values, are used to determine the location of damage. Col. 7, lines 7-9. Contrasting the disclosed technique with ultrasonic techniques, Lichtenwalner states that certain experimental results were validated using "[s]ubsequent ultrasonic inspection." Col. 9, lines 10-11.

The present application, on the other hand, discloses a system utilizing arrays of very small piezoelectric wafer active sensors. In many cases, for example, the length of each wafer will be less than 13mm per side (i.e., 169mm^2 surface area) and have a thickness of no greater than 0.49mm thick. Both active and passive evaluation techniques can be employed using such an array. For example, true ultrasonic (i.e., 200KHz and above) elastic waves can be propagated through a thin wall structure using the sensors. Sensors can be actuated in round robin fashion with detection at all sensors in the array to produce a rich matrix of information. The matrix can be analyzed using various computational techniques to determine the location of a damage feature in the structure. Advantageously, sensors of this type can directly excite Lamb waves into the structure without the need for mode conversion.

Alternatively, drive point impedance measurements can be taken at each sensor in order to detect changes in a sensing zone around that sensor. In other words, damage in the sensing zone

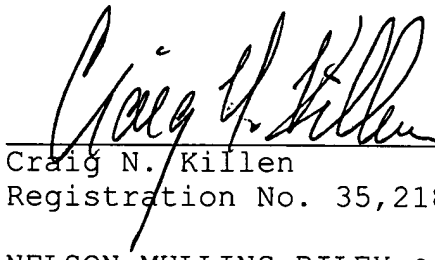
will cause changes in the drive point impedance of the particular sensor. These changes will be reflected in the sensor's impedance spectrum. As a result, impedance measurements taken before and after occurrence of the damage feature can be utilized to detect its presence. Preferably, sensors in the array are arranged so that their impedance sensing zones will overlap.

Passive detection modes are also contemplated in which the sensor outputs are monitored intermittently or continuously for stress waves in the structure. Stress waves may indicate, for example, that a foreign object has impacted the structure. Triangulation or other suitable techniques may be utilized to determine the impact's position with respect to the sensors.

Claims 3-31 have been added to set forth additional aspects of Applicant's inventive subject matter, many of such aspects being reflected in the above discussion. Of these new claims, claims 3, 14, 21 and 28 are independent claims. Each new claim is fully supported by the application as filed and is believed to be distinguishable over the art of record.

Based on the above, it is respectfully submitted that the present application, including claims 3-31, is in condition for allowance, and action to such effect is earnestly solicited. The Examiner is invited to telephone the undersigned should any minor issues remain after consideration of the above amendment.

Respectfully submitted,



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